R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE CLAIMS

Claim 9 has been amended to recite a device for spread spectrum communication comprising a toggle detecting unit which detects a candidate of a toggle point existing in a carrier of a received signal by calculating correlation between the carrier of the received signal and a pre-held expected signal and then searching for positions of phase changing points expected to be in the received signal but whose positions are currently unknown. In addition, claim 9 has been amended to recite that the received signal is a modulated waveform of the carrier wave itself, and that the pre-held expected signal is a signal having a length corresponding to 2 chip-times of a spread code or is a signal having a shorter length than 2 chip-times of the spread code, the 2 chip-times of the spread code being that portion of the expected signal extending from both sides of the toggle point a distance of 1 chip-time.

Claim 12 has been amended to recite a high-speed synchronization establishing method for spread spectrum communication comprising detecting a candidate of a toggle point existing in a carrier of a received signal, the received signal

being a modulated waveform of the carrier wave itself, and thereafter calculating a shift amount based on the detected candidate, and thereafter demodulating the received signal by multiplying the received signal by a spread code shifted according to the calculated shift amount. Claim 12 has also been amended to recite that the candidate of the toggle point is detected by calculating correlation between an expected signal and the carrier of the received signal and then searching for positions of phase changing points expected to be in the received signal but whose positions are currently unknown. And claim 12 now recites that the expected signal has a length corresponding to 2 chip-times of the spread code or has a shorter length than 2 chip-times of the spread code, the 2 chip-times of the spread code being that portion of the expected signal extending from both sides of the toggle point a distance of 1 chip-time.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

THE PRIOR ART REJECTION

Claims 9, 12, 16, and 18 were rejected under 35 USC 103 as being obvious in view of the combination of US 2001/0036221 ("Sato") and USP 7,257,148 ("Suzuki '148"); claims 15 and 17 were rejected under 35 USC 103 as being obvious in view of the

combination of Sato, Suzuki '148, and US 2002/0167991 ("Suzuki '991"); and claims 10, 11, 13 and 14 were rejected under 35 USC 103 as being obvious in view of the combination of Sato, Suzuki '148, and JP 6-90222 ("JP '222"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

The extensive comments provided by the Examiner in the Advisory Action are gratefully appreciated. In light of the Examiner's comments that features emphasized as being novel in the Response filed June 24, 2008 were not set forth in the claims, independent claims 9 and 12 have been amended to include some of the features. For example, amended independent claims 9 and 12 include the feature of the toggle detecting unit detecting a candidate of a toggle point existing in a carrier of a received signal by calculating correlation between the carrier of the received signal and a pre-held expected signal and then searching for positions of phase changing points expected to be in the received signal but whose positions are currently unknown. Additionally, amended claims 9 and 12 recite that the received signal is a modulated waveform of the carrier wave itself, and that while the pre-held expected signal is a signal having a length corresponding to 2 chip-times of a spread code or is a signal having a shorter length than 2 chip-times of the spread code, the 2 chip-times of the spread code is that portion of the

expected signal extending from both sides of the toggle point a distance of 1 chip-time. In addition, amended claim 12 now recites an order to the listed steps in that the toggle point candidate is detected and thereafter a shift amount is calculated and thereafter the received signal is demodulated.

It is respectfully submitted that the cited prior art does not disclose or suggest all of the features of the claimed present invention, including for example, a toggle detecting unit as set forth in claim 9 or any structure which performs similar steps to the toggle detecting unit as set forth in claim 12.

As according to the present claimed invention, the toggle detecting unit calculates correlation between a received signal (shown in Fig. 5(a)) and an expected signal having a length equal to or shorter than 2 chip-times (shown in Fig. 2), and then, according to the calculation result, it searches for the positions of phase changing points expected to be in the received signal shown in Fig. 5(a). The set of phase changing points obtained by the above procedure is the toggle signal shown in Fig. 5(b).

The received signal provided to the toggle detecting unit is not a signal which has been demodulated to a baseband signal, but rather is a modulated waveform of carrier wave itself, as according to the present claimed invention. The toggle detecting unit detects phase changing points expected to be in a received

signal but whose positions are unknown, i.e., unknown as to what value of spread code is in the received signal, not just unknown as to the shift amount of a pre-held, pre-determined spread code.

The toggle detecting unit tries to find phase changing points whose positions are unknown. As a result, in the toggle detecting unit, it is impossible to use one whole cycle of a pre-determined spread code as an expected signal. So, the toggle detecting unit uses a signal which indicates the waveform of 2 chip-times of a phase changing point (shown in Fig. 2) as a pre-held expected signal.

An important aspect of the claimed present invention is that the pre-held expected signal used in the toggle detecting unit is not a signal having a length equal to a whole length of a spread code, but rather, it is a signal having a length no more than 2 chip-times of a toggle point expected to be in a spread code (i.e., 1 chip-time before a toggle point and 1 chip-time after a toggle point). That is, the "2 chip-times of the spread code" in the present claimed invention is that portion of the expected signal extending from both sides of the toggle point a distance of 1 chip-time. This feature is shown in Fig. 2.

Indeed, the pre-held expected signal used in the claimed present invention is not a N chip-length signal (N>=2) comprised of plural (more than one) 2 chip-length signals. Rather, it has a length no more than 2 chip-times of the spread code. Thus, the

expected signal used in the demodulation unit is a set of candidates of toggle signals aligned in a length corresponds to one cycle of a spread code (i.e., an entire length of a spread code).

Still further, in the claimed present invention, the received signal is demodulated only after a candidate of a toggle point existing in a carrier of a received signal is detected and a shift amount is calculated based on the detected candidate (see, for example, amended claim 12). As such, the present claimed invention carries out synchronization of spread codes directly using a modulated waveform of a carrier wave (i.e., a waveform prior to demodulation to a baseband signal), and thus differs from conventional methods which demodulate a received signal to a baseband signal before carrying out synchronization of spread codes.

Neither Sato nor Suzuki '148 (cited in the rejection of claims 9 and 12) disclose structure which performs the same functions as the toggle detecting unit described above.

Sato describes a shift-amount calculation method which calculates the shift amount of a spread code in a demodulated signal (i.e., a baseband signal demodulated from a received signal). Sato, however, does not disclose finding phase changing points whose positions are unknown and thus, Sato cannot disclose

the fundamental function of the toggle detecting unit as according to the claimed present invention.

Suzuki '148 provides an expected signal shown as SG505 in Fig. 6E which has a length equal to or shorter than 2 chip-times. However, Suzuki '148 also employs a signal which has a length corresponding to one whole cycle of a spread code (i.e., the entire part of SG505 in Fig. 6E) as an expected signal. And Suzuki '148 does not use only one of the impulse signals as an expected signal.

In view of the foregoing, it is respectfully submitted that Sato and Suzuki '148 do not disclose a toggle detecting unit or the functions performed thereby.

Moreover, neither Sato, Suzuki '148, Suzuki '991 nor JP '222 discloses synchronizing a spread code using a received signal which is a modulated waveform of a carrier wave and thus prior to demodulation thereof, as according to the claimed present invention. That is, in the claimed present invention, the carrier frequency is demodulated and detected only after the synchronization is established. The prior art discloses the exact opposite order of these steps, i.e., demodulating the carrier wave and then synchronizing the spread code.

In view of the foregoing, it is respectfully submitted that the present invention as recited in amended independent claims 9 and 12 and dependent claims 10, 11 and 13-18 clearly patentably

distinguishes over Sato, Suzuki '148, Suzuki '991 and JP '222, taken in any combination consistent with the respective fair teachings thereof, under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

/Douglas Holtz/

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